Description

Device for retaining a fuel pump in a fuel container

The invention relates to a device for retaining a fuel pump in a fuel container of a motor vehicle, with a pump holder, with first retaining means of the pump holder, provided for supporting on a fixed component, in particular a baffle pot, and with second retaining means of the pump holder, provided for supporting the fuel pump, and with a damping device connecting the first and the second retaining means to one another, the retaining means being manufactured from plastic.

In motor vehicles nowadays, a rigid retention of the fuel pump in the baffle pot is avoided in order not to transmit noises arising during operation of the fuel pump to adjacent components. Rubber elements which are arranged between the first retaining means and the second retaining means have been known from practice for this purpose. The retaining means, which are manufactured from plastic, have the task of fixedly connecting the pump holder to the fuel pump and to the baffle pot. The noises arising during operation of the fuel pump are therefore exclusively damped by the rubber elements.

A disadvantage of the known device is that the rubber elements are very cost-intensive to manufacture and to fit.

EP 0 773 362 discloses a means of suspending a pump with a first and a second retaining device. The two retaining devices are connected to each other via a damping device. The damping device comprises

a multiplicity of limbs, with each limb comprising two vertical arms and a radial arm. Since the force deflection takes place essentially only in a vertical direction, to provide sufficient damping a relatively large number of limbs are required.

The invention is based on the problem of configuring the device of the type mentioned at the beginning in such a manner that it is constructed as cost-effectively as possible.

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A disadvantage of the known device is that the rubber elements are very cost-intensive to manufacture and to fit.

The invention is based on the problem of configuring the device of the type mentioned at the beginning in such a manner that it is constructed as cost-effectively as possible.

This problem is solved according to the invention in that the first retaining means, the second retaining means and the damping device are manufactured as a single piece.

This configuration enables the pump holder of the device according to the invention to be manufactured as a single piece. A complicated and cost-intensive installation of the pump holder is therefore unnecessary. Furthermore, the pump holder can be manufactured in a single working step, which leads to a further reduction in the manufacturing costs of the device according to the invention.

According to an advantageous development of the invention, the damping device turns out to be particularly simple in terms of design if the damping device has arms which are angled away from one another, and if during a movement of the fuel pump the arms are subject to a torsional and/or bending load. By means of this configuration, the fuel pump is suspended in a cardanic frame. This suspension permits very high degrees of freedom for the movements of the fuel pump in every direction. The movements of the pump are damped by the arms which are angled away from one another, and are therefore kept away from the retaining means, which are to be arranged on the baffle pot or the fuel container itself.

According to another advantageous development of the invention, the damping device is further simplified if the damping device has at least one first vertical arm and at least one first horizontal arm angled away from the first vertical arm.

According to another advantageous development of the invention, the transmission of intensive vibrations of the fuel pump to adjacent components can be kept particularly low if a second vertical arm is arranged between the first horizontal arm and a

second horizontal arm, which is connected to the second retaining means.

According to another advantageous development of the invention, the pump holder is highly stable if the first and/or the second horizontal arm is/are designed as an annular element.

According to another advantageous development of the invention, the connection of the pump holder to adjacent components requires a particularly low structural outlay if the first retaining means are designed such that they are supported radially on the inside of the baffle pot and such that they rest axially.

The stability of the pump holder is further increased, according to another advantageous development of the invention, if the second retaining means have a pipe length surrounding the fuel pump.

According to another advantageous development of the invention, the connection of the pump holder to the fuel pump requires a particularly low structural outlay if the second retaining means have latching hooks, arranged on the pipe length, for retaining the fuel pump.

The pump holder is capable of reliably damping noises and vibrations but, according to another advantageous development of the invention, is capable of reliably absorbing strong movements of the fuel pump if the first vertical arm has a radially inwardly pointing hook, and if the hook limits the vertical movement of the second retaining means.

In the case of intensive vibrations, the fuel pump, according to another advantageous development of the invention, is reliably kept in its designated position if

an annular element connected to the first retaining means has a radially inwardly pointing supporting element situated opposite the pipe length at a designated distance. This supporting element limits the radial movement of the fuel pump.

The manufacturing costs of the device according to the invention are further reduced if the single-piece component comprising first and second retaining means and the damping device is manufactured from plastic by injection molding.

According to another advantageous development of the invention, the sealing off of the fuel pump from the baffle pot requires a particularly low structural outlay if the fuel pump has an annular, elastomeric sealing element for the annular sealing of an opening arranged in the bottom region of the baffle pot.

According to another advantageous development of the invention, transmission of noises of the fuel pump via the sealing element can be avoided in a simple manner if the sealing element has an obliquely angled sealing lip, and if the free end of the sealing lip rests on the bottom of the baffle pot.

The invention permits numerous embodiments. To further clarify its basic principle, one of these is illustrated in the drawing and is described below. In the drawing

figure 1 shows a fuel pump retained in a fuel container by a device according to the invention,

figure 2 shows a side view of a pump holder of the device according to the invention from figure 1,

figure 3 shows a perspective illustration of the pump holder from figure 2.

Figure 1 shows a sectional illustration through a feed unit 2, which is arranged in a fuel container 1 of a motor vehicle, with a fuel pump 4, which is arranged in a baffle pot 3. The fuel pump 4 is retained by a pump holder 5 supported on the baffle pot 3. Furthermore, the fuel pump 4 has a sealing element 6 which is supported by the free end of a sealing lip 7 on the bottom of the baffle pot 3 in the region of an opening 9 closed by a bottom valve 8. The pump holder 5 and the sealing element 6 together form the device for retaining the fuel pump 4 in the baffle pot 3. The pump holder 5 has first retaining means 10 supported on the baffle pot 3 and second retaining means 11 retaining the fuel pump 4. The retaining means 10, 11 are manufactured as a single piece with a damping device 22. The first retaining means 10 are connected to one another via an annular element 12 and to a first vertical arm 13. A horizontal arm 14 designed as an annular element adjoins the first vertical arm 13. The first horizontal arm 14 is connected to a second horizontal arm 16 via a second vertical arm 15. The second horizontal arm 16 is connected to a pipe length 17 surrounding the fuel pump 4. The arms 13-16 which are angled away from one another form the damping device 22. During a movement of the fuel pump 4 the arms 13-16 are subject to a bending and torsional load and therefore produce an elastic retention. Vibrations of the fuel pump 4 are likewise damped. The second retaining means 11 are arranged on the pipe length 17. To simplify the drawing, the first retaining means 10 are illustrated rotated

into the plane of the paper. In actual fact, in each case three first retaining means 10 are distributed over the circumference.

The vertical and horizontal arms 13-16 form a cardanic frame which permits designated movements of the fuel pump 4. During a movement of the fuel pump 4 the arms 13-16 are subject to a torsional and bending load.

The fuel pump 4 sucks up fuel from the fuel container 1 via the bottom valve 8 and feeds it to a connector 18. A fuel line (not illustrated) leading to an internal combustion engine of the motor vehicle can be connected to the connector 18.

Figure 2 shows, in a side view of the pump holder 5 from figure 1, that the second retaining means 11 for retaining the fuel pump 4 have latching hooks 19 arranged on the pipe length 17. Furthermore, radially inwardly pointing hooks 20 are arranged on the first vertical arm 13 and limit the vertical movement of the pipe length 17 and therefore the movement of the fuel pump 4 illustrated in figure 1.

Figure 3 shows, in a perspective illustration of the pump holder 5, that the annular element 12 connecting the first retaining means 10 has radially inwardly pointing supporting elements 21. The supporting elements 21 are at a distance from the pipe length 17 and limit its freedom of movement and therefore the freedom of movement of the fuel pump 4 in the radial direction.